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Please find below and/or attached an Office communication concerning this application or proceeding.

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/557,666
Filing Date: December 13, 2005
Appellant(s): LINDSTROM, JOHAN

Keith J. Barkaus
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 08/21/2008 appealing from the Office action mailed 12/17/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5952815	Rouillard et al.	9-1999

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

The following is the Final Office action that has been sent out on 12/17/2007, and the examiner's response to the Applicant's argument in the Advisory Action sent on

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3-5, 7-10, 12-14, 17-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Rouillard et al. (US Patent No. 5952815, hereinafter '815).

Claims 1, 10, '815 teaches an arrangement for storing electrical energy and a method of charging a plurality of electrical storage modules connected in series between a first terminal and a second terminal (see col. 19, line 52-col. 20 line 17; col. 21 line 40-col. 22 line 12) (Fig. 31, 35) comprising:

an electric charge source (e.g., charger) between a first terminal and a second terminal (Fig. 31), a plurality of electrical storage modules connected in series between the first terminal

and the second terminal, each electrical storage module of the plurality of electrical storage modules having a respective nominal module voltage (Fig. 31);

a DC-to-DC converter (Fig. 31) coupled to the electric charge source and to each of the electrical storage modules, the DC-to-DC converter being operable to receive incoming power from the electric charge source and to supply a respective voltage fraction of the DC-system voltage to each electrical storage module,

wherein the DC-to-DC converter is further operable to control the respective voltage fraction to vary the respective voltage fraction over a time period within a voltage interval around the respective nominal module voltage of each electrical storage module such that during the time period the respective voltage fraction supplied to each electrical storage module is set to be higher than the respective nominal module voltage of each electrical storage module (see col. 19, line 52-col. 20 line 17; col. 21 line 40-col. 22 line 12)(Fig. 35).

For claims 3, 12, '815 teaches the limitation of claims 1, 10 as discussed above. '815 further teaches that the DC-to-DC converter is operable to control the respective voltage fraction over the electrical storage modules such that an average time interval during which the voltage fraction exceeds the nominal module voltage is substantially equal with respect to all the modules (e.g., each module is made up by the same type individual component, therefore the behalf of each module over time are statistically substantially identical) (see col. 19, line 52-col. 20 line 17; col. 21 line 40-col. 22 line 12)(Fig. 31, 35).

For claim 4, '815 teaches the limitation of claim 1 as discussed above. '815 further teaches that the DC-to-DC converter is operable to control the respective voltage

fraction over the electrical storage modules such that an average voltage fraction of the DC-system voltage being distributed to each module is substantially equally large for all the modules (see col. 19, line 52-col. 20 line 17; col. 21 line 40-col. 22 line 12)(Fig. 35).

For claim 5, '815 teaches the limitation of claim 1 as discussed above. '815 further teaches that at least two of the electrical storage modules are included in a common battery unit, the unit having a separate set of access points for each module, and each of the access points is coupled to the DC-to-DC converter (Fig. 31).

For claim 14, '815 teaches the limitation of claims 5, 10 as discussed above. '815 further teaches that there are two of electrical storage modules (e.g., the first two modules)(Fig. 31).

For claim 7, '815 teaches the limitation of claim 1 as discussed above. '815 further teaches that the electrical storage modules are operable to provide power to an electrical system of a vehicle via the first and second terminals (i.e., the electrical storage modules is capable to be used to power an electric vehicle)(col. 1, lines 19-32).

For claim 8, 9, '815 teaches the limitation of claim 1 as discussed above. '815 further teaches that the electric charge source is an electric generator (i.e., the electric generator is inherently taught in order for the electrical storage modules used in the electric vehicle)(col. 1, lines 19-32).

For claim 19, please see the recitations in the discussion above for claims 1, 3-9 rejection.

For claims 17-18, 20, '815 teaches the limitation of claims 1, 10, and 19 as discussed above. '815 further teaches that the DC-to-DC converter is operable to

control the respective voltage fraction such that when the respective voltage fraction is varied to be above the respective nominal module voltage, another respective voltage fraction is varied to be below the respective nominal module voltage for another respective module (i.e., if one of the module voltage is varies to be above the respective nominal module voltage, another respective voltage fraction would be inherently varied to be below the respective nominal module voltage for another respective module since the total charging voltage equals to the sum of the voltage of all modules)(see col. 19, line 52-col. 20 line 17; col. 21 line 40-col. 22 line 12)(Fig. 31, 35).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rouillard et al. (US Patent No. 5952815, hereinafter '815).

Claims 2 and 11, '815 teaches the limitations of 1 as discussed above. '815 does not explicitly teach that the voltage interval represents a voltage variation of less than 25% of any of the nominal module voltages. However, since applicant did not disclose any particular reasons for choosing the voltage variation of less then 25%, it would apparently be a design choice for choosing a value for the range of the voltage interval. And it has been held that the discovery of the optimum value of a result

effective variable in a known process is ordinarily within the skill in the art. *In re Boesch and Slaney*, 205 USPQ 215 (CCPA 1980).

Examiner' Response to Applicant's Argument in the previous Advisory

Action:

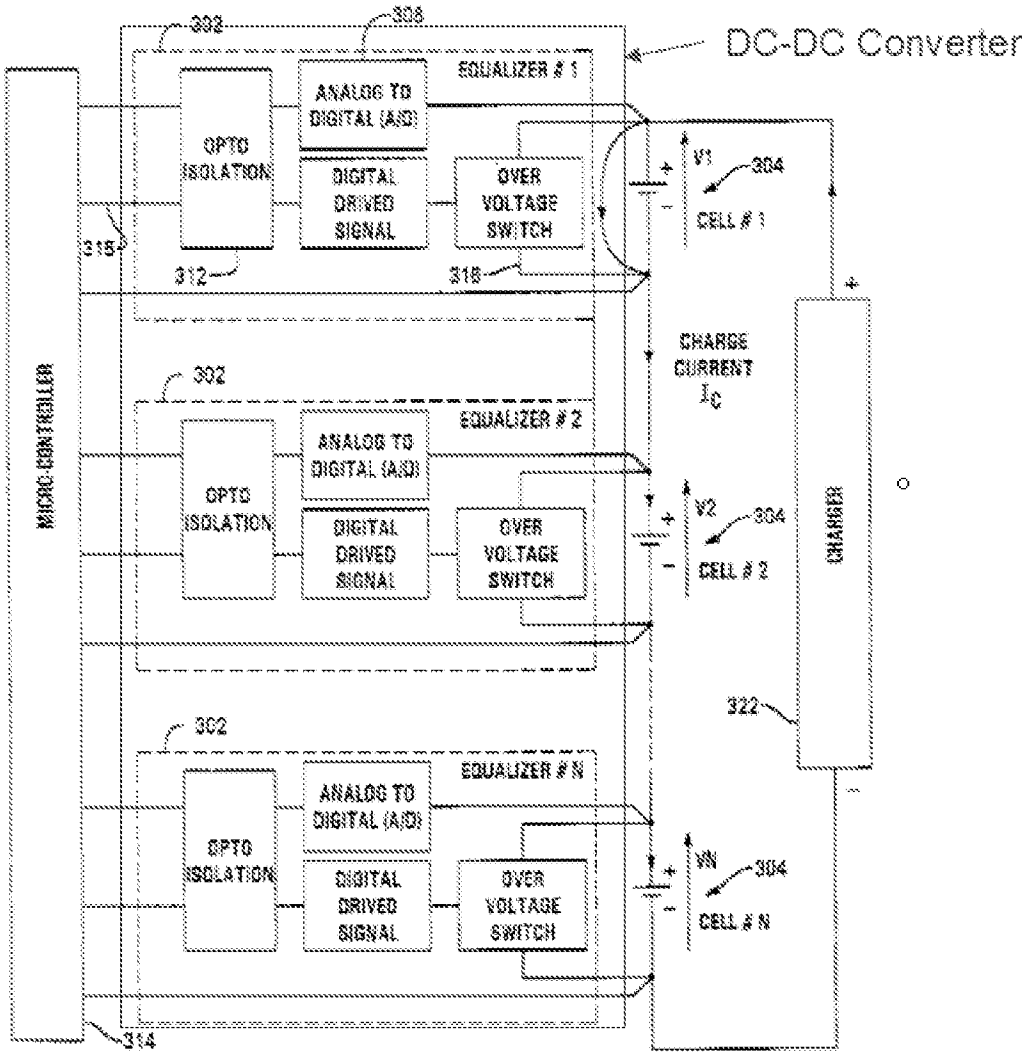
Continuation of 11. does NOT place the application in condition for allowance because: Applicant's arguments in the Remarks filed on 6/17/2008 have been fully considered but are not persuasive.

Applicant state in the REMARKS that

" Rouillard, however, does not disclose "a DC-to-DC converter coupled to the electric charge source and to each of the electrical storage modules, the DC-to-DC converter being operable to receive incoming power from the electric charge source and to supply a respective voltage fraction of the DC-system voltage to each electrical storage module wherein the DC-to-DC converter is further operable to control the respective voltage fraction to vary the respective voltage fraction over a time period within a voltage interval around the respective nominal module voltage of each electrical storage module such that during the time period the respective voltage fraction supplied to each electrical storage module is set to be higher than the respective nominal module voltage of each electrical storage module," as is required by claim 1".

As clearly can be seen in the Fig. 31 copied below with Examiner's highlight, '815 does disclose the limitations above including a DC-DC CONVERTER which coupled to the electric charge source (i.e., the CHARGER) and to each of the electrical storage modules (i.e., CELL#1…CELL# N), the DC-to-DC converter being operable to receive incoming power from the electric charge source and to supply a respective voltage fraction of the DC-system voltage to each electrical storage module (i.e., V1….Vn) wherein the DC-to-DC converter is further operable to control the respective voltage fraction to vary the respective voltage fraction over a time period within a voltage interval around the respective nominal module voltage of each electrical storage module such that during the time period the respective voltage fraction supplied to each electrical storage module is set to be higher than the respective nominal module voltage of each electrical storage module (also see Fig 35).

Fig. 31

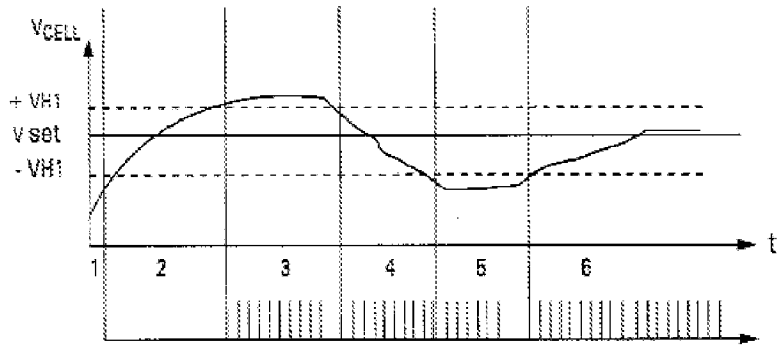


Applicant further state that

"there is no disclosure in Rouillard of a DC-to-DC converter "operable to control the respective voltage fraction to vary the respective voltage fraction over a time period within a voltage interval around the respective nominal module voltage of each electrical storage module such that during the time period the respective voltage fraction supplied to each electrical storage module is set to be higher than the respective nominal module voltage of each electrical storage module."

As clearly seen in Fig. 35 copied below, '815 does disclose the above limitations applicant claimed:

Fig. 35



For at least the reason above, the claim rejections of the previous office action is maintained.

(10) Response to Argument

1) Appellant Arguments regarding Claim 1 rejection under 35 USC 102(b):

a. Appellant argued on page 5, first paragraph and page 6 copied below

As was noted in Applicants' previous response dated June 17, 2008, Rouillard does not disclose "a DC-to-DC converter coupled to the electric charge source and to each of the electrical storage modules, the DC-to-DC converter being operable to receive incoming power from the electric charge source and to supply a respective voltage fraction of the DC-system voltage to each electrical storage module wherein the DC-to-DC converter is further operable to control the respective voltage fraction to vary the respective voltage fraction over a time period within a voltage interval around the respective nominal module voltage of each electrical storage module such that during the time period the respective voltage fraction supplied to each electrical storage module is set to be higher than the respective nominal module voltage of each electrical storage module," as is required by claim 1, for example.

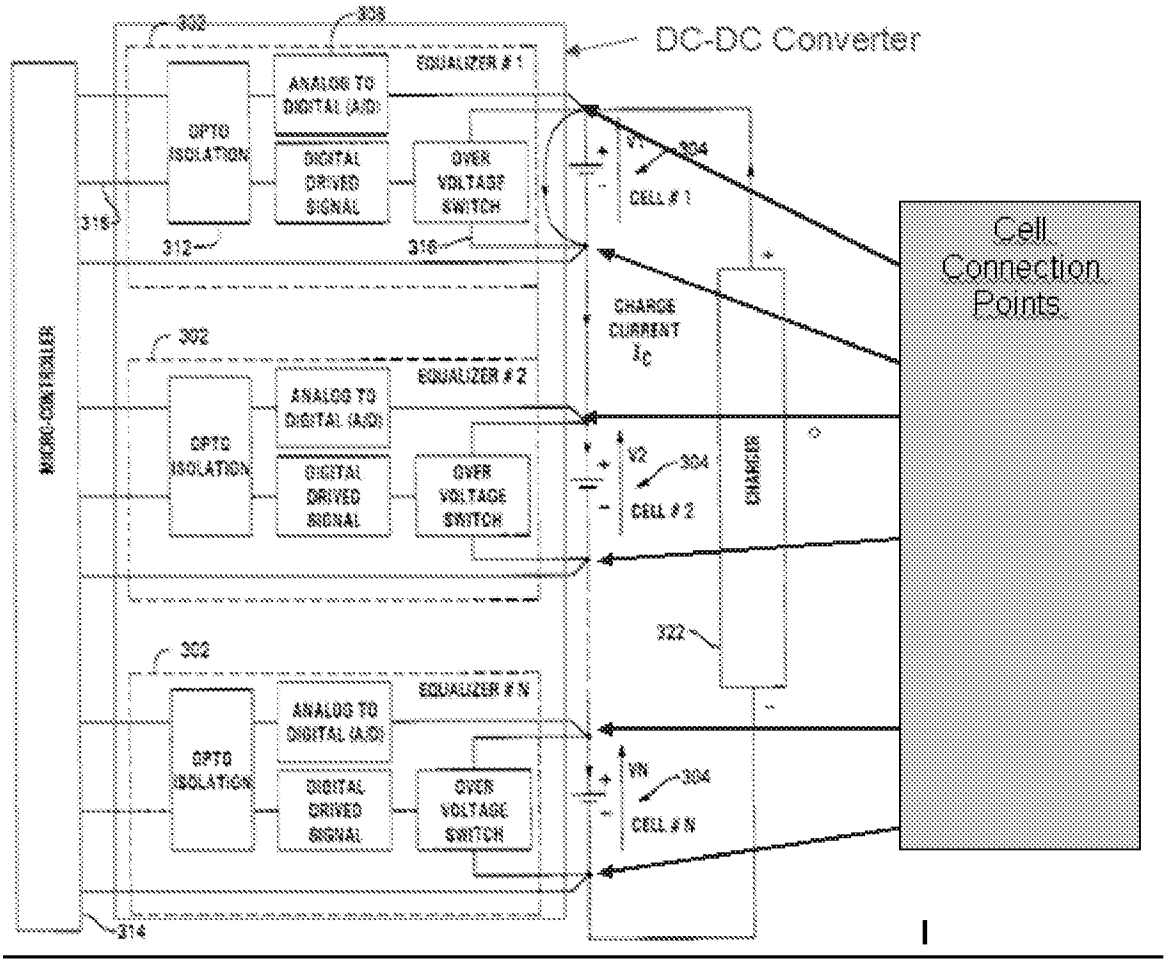
Examiner Responds:

Examiner respectfully disagree appellants above arguments. As examiner clearly indicated in Claim 1 rejection under 35 USC 102 (b) of the Final Office Action and the Advisory Action that Rouillard reference does discloses the claimed limitatioms of claim1 including "**a DC-to-DC converter** (see attached Fig 31 with the examiner's highlight) coupled to the electric charge source and to each of the electrical storage modules (i.e., the DC/DC converter circuit of Rouillard reference receives the input electrical power from the charging source, and converting the electrical energy to controlled output voltage as a fraction of the input charging source voltage to each battery cell), the DC-to-DC converter being operable to receive incoming power from the electric charge source and to supply a respective voltage fraction of the DC-system voltage to each electrical storage module (i.e., the DC/DC converter circuit of Rouillard reference receives the input electrical power from the charging source, and converting the electrical energy to controlled output voltage as fraction of the input charging source voltage to each battery cell),

wherein the DC-to-DC converter is further operable to control the respective voltage fraction to vary the respective voltage fraction over a time period within a voltage interval around the respective nominal module voltage of each electrical storage module such that during the time period the respective voltage fraction supplied to each electrical storage module is set to be higher than the respective nominal module voltage of each electrical storage module (see col. 20 lines 18-48)(Fig. 35).

b. Appellant further argued in third paragraph on page 6 copied below:

Fig. 31



Further, it follows that Rouillard also fails to disclose a DC-to-DC converter that is "coupled to the electric charge source" or that it is connected "to each of the electrical storage modules." As is noted above, there does not appear to be any disclosure in Rouillard of a DC-to- DC converter, as required by claim 1, for example of the present application. However, even if the equalizer modules 302 of Rouillard were DC-to-DC converters, none of these modules is connected to each of the cells C 1, C2, and CN.

Examiner Responds:

Examiner respectfully disagree appellants above arguments. Since Appellant has not disclose or define any special technical features regarding the claimed DC- to

DC converter, in a broad sense one of ordinary in art would interpret that a DC-to-DC converter receives input power from an input DC voltage source and converts the power received to an actively controlled or regulated output DC voltage, In the current case, Appellant claims a DC to DC converter as a battery charging circuit to receive an input DC voltage then output actively controlled DC voltages to charge each of the battery cells to be charged. Now from looking at the Rouillard reference (see figures 31, 35 below with Examiner's highlight) it is clear that Rouillard does discloses a DC-to-DC converter in Fig. 31 (see Fig. 31 with examiner's highlight above) which receives input DC voltage from a DC electric charge source (CHARGER) and outputs actively controlled DC output voltages of V1, V2, …, VN as a fraction of the input voltage, to each of the electrical storage Cell modules C1, C2, …, CN to be charged. Apparently Rouillard discloses all the technical features and claimed limitations of a DC to DC converter as Appellant claimed, and it does also perform the same technical functioning of charging the battery cells just as Appellant claimed. Therefore, Examiner maintains his position that the prior art Rouillard does discloses the limitations of an DC to DC converter as Appellant claimed.

c. Appellant further argued in the forth paragraph on page 6 copied below:

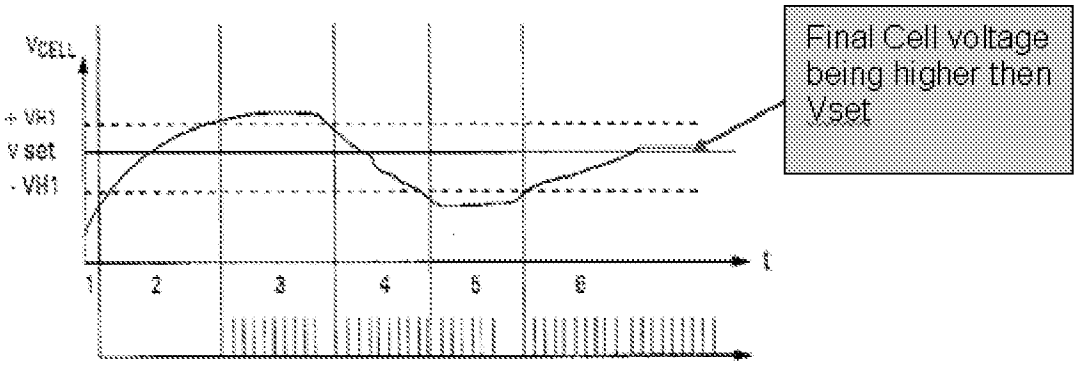
In addition, there is no disclosure in Rouillard of a DC-to-DC converter "operable to control the respective voltage fraction to vary the respective voltage fraction over a time period within a voltage interval around the respective nominal module voltage of each electrical storage module such that during the time period the respective voltage fraction supplied to each electrical storage module is set to be higher than the respective nominal module voltage of each electrical storage module." Again, as is noted above, there is no disclosure in Rouillard of a DC-to-DC converter at all. Further, there is no

disclosure anywhere in Rouillard of any element is "operable to control the respective voltage fraction to vary the respective voltage fraction over a time perid…"

Examiner Responds:

Examiner respectfully disagree appellants above arguments. As discussed above, and further showing in Fig. 35 that prior art Rouillard does clearly discloses the DC-to-Dc converter. As regarding Appellant's argument that "there is no disclosure anywhere in Rouillard of any element is "operable to control the respective voltage fraction to vary the respective voltage fraction over a time period…" Examiner re-state his position: as clearly shown in the attached Fig. 35 Rouillard does clearly discloses the above claimed the limitation, including the DC-to-DC converter "operable to control the respective voltage fraction (Vset) to vary the respective voltage fraction (i.e., Vset+/-VH1) over a time perid…(i.e., over the time period of 1, 2, …, 6)" (see figures 31, 35)

Fig. 35



Rouillard further disclosed in col. 20, lines 18-48 of the specification how the output voltages to each cell module is being actively regulated/controlled around the cell voltage set point Vset as copied below:

A more detailed illustration of an equalizer module in accordance with one embodiment of the invention is provided in FIG. **32**. In this embodiment, a micro-controller (not shown) manages the operation of the equalizer module **330**, such as by defining equalization voltage setpoints, generating PWM control signals, and determining cell voltage levels. Voltage isolation between the micro-controller and the equalizer module **330** is provided by opto-isolators OPTO **1–4**.

The micro-controller controls the ADC **334** when determining the potential across the cell **332** by providing appropriate signals to the CLK/E and CONVERT inputs **340, 341** of the equalizer module. A signal representative of the measured voltage of the cell **332** is made available at the output D_{out} **338**. When the micro-controller determines that the cell voltage measured by the ADC **334** is lower than the pre-established equalization voltage setpoint or the over-voltage setpoint, the PWM output node **336** is low, and the power MOSFET transistor **342** is OFF or in a non-conducting state. During this period, all of the charge current, I_C, is delivered to the cell **332**. FIG. **33**B depicts an equivalent circuit representation of the equalizer module **330** when the transistor **342** is in a non-conducting state.

When the voltage across the cell **332** reaches a voltage setpoint, the controller generates a digital PWM signal which is a PID function of the measured cell voltage and various charge parameters, including the equalization voltage setpoint, filtering time constants, and the sampling frequency. FIG. **33**A is an equivalent circuit depiction of the equalizer circuit **330** when the transistor **342** is in a conducting state.

Therefore, it is clear shown that the DC to Dc converter that the prior art Rouillard disclosed does actively control and regulate the output DC voltage just as appellant claimed, and therefore Examiner maintains his position and the ground of the rejection.

d). <u>As regarding to Appelent's argument in para 2 on page 7:</u>

there is no defined time period at all, much less one in which the voltage is "set to be higher than the respective nominal module voltage of each electrical storage module," as is also required by claim 1. As was described in Applicants'

Examiner Responds:

Examiner respectfully disagree appellants above arguments and respectfully point out that at the end of time period 6 the cell voltage is maintained at a higher voltage then the norminal cell module voltage Vset, as it is clearly shown in the Fig. 35 above. Therefore, Examiner maintains his position and the ground of rejection.

2). Appellant argument regarding the claim 10 and 19 Rejection under 35 USC 102(b),

Examiner Responds:

Since Appellant repeats the same argument in claim 1, please see Examiner's response above.

3). Appellant argument regarding the claim 2 and 11 Rejection under 35 USC 103(a),

Since Appellant repeats the same argument in claim 1 and 10, please see Examiner's response above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

JZ

Conferees:

/Akm Enayet Ullah/

Supervisory Patent Examiner, Art Unit 2838

Darren Schuberg /DS/

TQAS TC 2800